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CROSSWIND-RESISTANT OUTDOOR TENT

TECHNICAL FIELD

The present invention relates to an outdoor tent of a type having an awning roof at its top and open peripheral sides and, more particularly, to a crosswind-resistant outdoor tent which is characterized by the structure of its roof.

BACKGROUND OF THE INVENTION

Conventionally mainly used as an outdoor tent of a type having an awning roof at its top and open peripheral sides is an outdoor tent having a gable roof of which right and left upright sides are triangle in shape. As for an outdoor tent with a gable roof, however, the larger the tent, the longer the depth and the higher the roof. This not only leads to difficulties in putting an awing over a framework but also increases the area of roof to be subjected to crosswind, thus increasing the degree of risk when subjected to a strong gust of crosswind.

In the light of the above conventional art, the present invention is intended to achieve an outdoor tent of a type having an awning roof at its top and open peripheral sides, in which the roof has lower height to endure a strong gust of crosswind and which can have long depth and thus large floor space.

DISCLOSURE OF THE INVENTION

The inventor of this invention has solved the aforementioned problems by the following means :

(1) A crosswind-resistant outdoor tent of a type having an awing roof at its top and open peripheral sides, the awing roof comprising: an awing, which includes left and right upright sides which are trapezoidal, a zenith which is flat, and front and rear faces which are inclined to extend downward apart from each other; trapezoidal frames forming left and right sides for supporting the awing; and four bridge beams which are fixed at both ends thereof to corresponding corners of the trapezoidal frames so as to extend horizontally between the trapezoidal frames.

(2) A crosswind-resistant outdoor tent of a type having an awing roof at its top and open peripheral sides, the awing roof comprising: an awing, which includes left and right upright sides which are trapezoidal, a zenith which is flat, and front and rear faces which are inclined to extend downward apart from each other; trapezoidal frames forming left and right sides for supporting the awing; and four bridge beams which are fixed at both ends thereof to corresponding corners of the trapezoidal frames so as to extend horizontally between the trapezoidal frames, wherein

said awing roof is provided with a ventilator comprising one opening or a ventilator comprising a plurality of openings formed adjacent to each other and

with one or more sheet lids for covering said ventilator of which an upper edge is fixed to a portion about the center of the zenith of the awing roof by sewing or adhesive bonding and the opposite side edge is connected to portions near the awing edges adjacent to the ventilator by one or more tie-down means capable of exhibiting moderate fixing strength so that said lid is adapted to automatically open when subjected to gust or big wind to prevent the awing from being blown away.

(3) A crosswind-resistant outdoor tent according to the aforementioned (1) or (2), further including one or more reinforcing members arranged to have a projecting ridge on the zenith in order to prevent rain water from collecting on the flat zenith of the awing having trapezoidal sides.

(4) A crosswind-resistant outdoor tent according to the aforementioned (1) or (2), further including a convex portion provided in the zenith such that the sides of the zenith are triangle in shape in order to prevent rain water from collecting on the flat zenith of the awing having trapezoidal sides.

(5) A crosswind-resistant outdoor tent according to any one of the aforementioned (1) through (4), wherein the framework of the awing roof having the trapezoidal sides comprises a frame of the roof zenith which is composed of two or three ridge beams and two side beams both made of metallic pipes, a frame of the roof bottom which is composed of two pole plates and two end plates both made

of metallic pipes, and four rafters made of metallic pipes whereby the frame of said roof zenith and the frame of the roof bottom are joined.

(6) A crosswind-resistant outdoor tent according to any one of the aforementioned (1) through (5), wherein the framework of the awing roof having the trapezoidal sides and the poles supporting the framework of the roof are adapted to be freely assembled or disassembled by assembling means suitable for the respective joints.

(7) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (6), wherein the ventilators are formed to have such shape, number, and width that the portions of the awing roof remaining between adjacent openings can retain strength of the awing roof and the ventilators are formed to have such size that the total area of the ventilators allow said lid to open when subjected to gust or big wind.

(8) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (7), wherein the sheet lid is subjected to waterproof treatment.

(9) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (8), wherein the sheet lid is made of sail cloth the same as that of the awing.

(10) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (9), wherein the tie-down means is means allowing a part or parts of the corner edge of the awing adjacent to the ventilator to be

free.

(11) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (10), wherein the lid on the awing roof is tied down by connecting the both lower ends of the lid via rubber cords.

(12) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (10), wherein the lid on the awing roof is tied down by connecting portions near the both lower ends of the ventilator and the both lower ends of the lid via rubber cords passing through and stopped at both ends thereof by rings made of cord, metal, or plastic fixed to the both lower ends of the lid and fixed to portions of the awing around the both lower corner edges of the ventilator.

(13) A crosswind-resistant outdoor tent according to any one of the aforementioned (2) through (9), wherein the left and right side edges of the sheet lid are fixed via expansible waterproof sheets comprising bellows arranged at the left and right ends of the ventilator so as to prevent rain water from entering into the tent through the left and right ends of the ventilator when said lid opens.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1(a)-1(d) are perspective views showing respective structures of embodiments of the present invention, wherein Fig. 1(a) is a perspective view showing the structure of a first embodiment of the

present invention, Fig. 1(b) is a perspective view of the structure of a second embodiment of the present invention, Fig. 1(c) is a perspective view showing the structure of a third embodiment of the present invention, and Fig. 1(d) is a perspective view showing the structure of a fourth embodiment of the present invention;

Fig. 2 is an explanatory perspective view of the first embodiment of the present invention;

Fig. 3(a) is a perspective view showing a framework of a variation of the first embodiment of the present invention and Fig. 3(b) is a perspective view showing a reinforcing member of the variation of the first embodiment;

Fig. 4(a) is a perspective view showing a framework of the second embodiment of the present invention and Fig. 4(b) is a perspective view showing a reinforcing member of the second embodiment;

Fig. 5(a) is a perspective view showing a framework of the third embodiment of the present invention and Fig. 5(b) is an explanatory side view of the third embodiment;

Fig. 6 is an explanatory perspective view of the fourth embodiment of the present invention;

Figs. 7(a), 7(b) are explanatory perspective views of a tie-down means of the fourth embodiment of the present invention;

Fig. 8 is an explanatory perspective view of the tie-down means of the fourth embodiment of the present invention;

Fig. 9 is a schematic illustration for comparison of height between a crosswind-resistant outdoor tent, of which an awing roof has flat zenith and trapezoidal upright sides, and a conventional outdoor tent having a gable roof;

Fig. 10 is a schematic illustration for comparison of height among the crosswind-resistant outdoor tent, of which an awing roof has flat zenith and trapezoidal upright sides, the conventional outdoor tent having a gable roof, and a crosswind-resistant outdoor tent according to the third embodiment;

Figs. 11(a), 11(b) are illustrations showing a method of assembling a framework according to the present invention;

Fig. 12 is a comparative table indicating blowing-up wind pressures on tent; and

Fig. 13 is a comparative table indicating blowing-up wind pressures on windward side of tent.

EXPLANATION OF REFERENCE SIGNS

1 awing of the present invention with trapezoidal upright sides

1′ awing of conventional gable roof

2 framework

3 ridge beam

4 side beam

5 rafter

6 pole plate

7 end plate

8 pole
9 brace
10 reinforcing member (side beam)
10a hook
11 reinforcing member (ridge beam)
11a hook
11b back of reinforcing member
13 ventilator
14 sheet lid
15 tie-down means
16 rubber cord
17 ring
18 rubber cord
19 waterproof sheet
100 upright side of awing roof
100a zenith of awing roof
100b projection
100c convex portion of awing roof
100d side of awing roof
200 side of framework
200a zenith of framework
200b convex portion of framework
200c convex portion of framework

BEST MODE FOR CARRYING OUT THE INVENTION

Embodiments of the present invention will be described with reference to exemplary drawings.

Figs. 1(a)-1(d) are perspective views showing

respective structures of embodiments of the present invention, wherein Fig. 1(a) is a perspective view showing the structure of a first embodiment of the present invention, Fig. 1(b) is a perspective view of the structure of a second embodiment of the present invention, Fig. 1(c) is a perspective view showing the structure of a third embodiment of the present invention, and Fig. 1(d) is a perspective view showing the structure of a fourth embodiment of the present invention; Fig. 2 is an explanatory perspective view of the first embodiment of the present invention; and Fig. 3(a) is a perspective view showing a framework of a variation of the first embodiment of the present invention and Fig. 3(b) is a perspective view showing a reinforcing member of the variation of the first embodiment.

Fig. 4(a) is a perspective view showing a framework of the second embodiment of the present invention and Fig. 4(b) is a perspective view showing a reinforcing member of the second embodiment; Fig. 5(a) is a perspective view showing a framework of the third embodiment of the present invention and Fig. 5(b) is an explanatory side view of the third embodiment; Fig. 6 is an explanatory perspective view of the fourth embodiment of the present invention; Figs. 7(a), 7(b) are explanatory perspective views of a tie-down means of the fourth embodiment of the present invention; and Fig. 8 is an explanatory perspective view of the tie-down means of the fourth embodiment of the present invention.

Further, Fig. 9 is a schematic illustration for comparison of height between a crosswind-resistant outdoor tent, of which an awing roof has flat zenith and trapezoidal upright sides, and a conventional outdoor tent having a gable roof; Fig. 10 is a schematic illustration for comparison of height among the crosswind-resistant outdoor tent, of which an awing roof has flat zenith and trapezoidal upright sides, the conventional outdoor tent having a gable roof, and a crosswind-resistant outdoor tent according to the third embodiment; Figs. 11(a), 11(b) are illustrations showing a method of assembling a framework according to the present invention; Fig. 12 is a comparative table indicating blowing-up wind pressures on tent; and Fig. 13 is a comparative table indicating blowing-up wind pressures on windward side of tent.

In the drawings, numeral 1 designates an awing of the present invention with trapezoidal upright sides, 1' designates an awing of conventional gable roof, 2 designates a framework, 3 designates a ridge beam, 4 designates a side beam, 5 designates a rafter, 6 designates a pole plate, 7 designates an end plate, 8 designates a pole, 9 designates a brace, 10 designates a reinforcing member (side beam), 10a designates a hook, 11 designates a reinforcing member (ridge beam), 11a designates a hook, 11b designates a back of the reinforcing member, 13 designates a ventilator, 14

designates a sheet lid, 15 designates a tie-down means, 16 designates a rubber cord, 17 designates a ring, 18 designates a rubber cord, 19 designates a waterproof sheet, 100 designates an upright side of the awing roof, 100a designates a zenith of the awing roof, 100b designates a projection, 100c designates a convex portion of the awing roof, 100d designates a side of the awing roof, 200 designates a side of the framework, 200a designates a zenith of the framework, 200b designates a convex portion of the framework, and 200c designates a convex portion of the framework.

As shown in the perspective views showing the structures of embodiments of the present invention in Figs. 1(a)-1(d) and the explanatory perspective view of the first embodiment of the present invention in Fig. 2, each of crosswind-resistant outdoor tents of the present invention is an outdoor tent of a type having an awning roof at its top and open peripheral sides. An awing roof of the outdoor tent comprises an awing 1 and a framework 2. The awing roof comprises an awing 1, which includes left and right upright sides 100 which are trapezoidal, a zenith 100a which is flat, and front and rear faces which are inclined to extend downward apart from each other, and a framework 2 supporting the awing 1 and having a horizontal quadratic prism shape, which is composed of trapezoidal frames forming left and right sides 200 and four bridge beams (ridge beams 3) which are fixed at both

ends to corresponding corners of the trapezoidal frames so as to extend horizontally between the trapezoidal frames.

In the framework 2 of the awing roof having the trapezoidal frames forming the sides 200, a zenith 200a is composed of two or three ridge beams 3 (see Figs. 5(a), 5(b)) and two side beams 4 made of metallic pipes and a roof bottom is composed of two pole plates 6 and two end plates 7 made of metallic pipes.

The frame of the roof zenith 200a composed of the ridge beams 3 and side beams 4 and the frame of the roof bottom composed of the pole plates 6 and the end plates 7 are joined by rafters 5 made of metallic pipes.

The framework 2 of the awing roof is supported by a plurality of (four or more) poles 8 and the framework 2 of the awing roof and the poles 8 are joined by braces 9.

Hereinafter, embodiments of the crosswind-resistant outdoor tent of the present invention will be described in detail.

(First Embodiment)

An embodiment of the present invention shown in the perspective view of Fig. 1(a) showing the structure of the first embodiment of the present invention comprises a framework 2 composed of ridge beams 3, side beams 4, rafters 5, pole plates 6, end plates 7, and poles 8, all of which are made of metallic pipes, and an awing 1

including left and right trapezoidal sides 100, a flat zenith 100a, and front and rear inclined faces extending downward apart from each other, wherein the awing 1 is put on the framework 2.

As for the assembly of the framework 2, as can be seen from the illustrations in Figs. 11(a), 11(b) showing the ways of assembling the frames, the assembly of the ridge beams 3, the side beams 4, and the rafters 5 can be done by means shown in Fig. 11(a) and the fitting of the pole plates 6, the end plates 7, and the rafters 5 to the poles 8 can be done by the means shown in Fig. 11(b), that is, the both assemblies can be done by conventional means.

The framework 2 of the awing roof having the trapezoidal sides 100 and the poles 8 supporting the framework 2 of the roof are adapted to be freely assembled or disassembled by assembling means suitable for the respective joints.

Each brace 9 is designed such that one end thereof is always fixed to the pole 8 and the other end is attached to the pole plate 6 or the end plate 7 during the assembly of the outdoor tent, thereby reinforcing the joints between the awing roof and the poles 8 to serve for preventing the fall of the outdoor tent.

Since the awing roof 1 of which the upright sides 100 are composed of trapezoidal frames, the zenith 100a is flat, and the front and rear faces are inclined faces extending downward apart from each other according to the

aforementioned structure, as shown in the schematic illustration of Fig. 9 for comparison of between the height h1 of the crosswind-resistant outdoor tent of the present invention, having the awing roof 1 of which the upright sides 100 are composed of trapezoidal frames and the zenith 100a is flat, and the height h1′ of a conventional outdoor tent having a gable roof 1′, the height h1 of the awing roof of the present invention can be lower than that of the conventional gable roof 1′ by 70-20%, thus not only enduring a strong gust of crosswind but also providing other effects such as enabling the construction of a tent longer depth.

As shown in the perspective view of Fig. 3(a) showing a framework of a variation of the first embodiment of the present invention and in the perspective view of Fig. 3(b) showing a reinforcing member of the variation of the first embodiment, it is preferable that one or more reinforcing members (side beams) 10 are provided to extend between the two ridge beams 3, 3 of the zenith 200a of the framework 2 to support the awing 1 (see Fig. 1(a)), preventing sag of the awing 1.

In the crosswind-resistant outdoor tent of the first embodiment shown in Fig. 1(a) and Fig. 2, rain water may collect on the zenith during the rain because the zenith 100a of the awing roof is flat. Consequently, the provision of the reinforcing member (side beam) 10 as

the variation of the first embodiment shown in Fig. 3(a) prevents rain water from collecting and adds entire strength to the outdoor tent.

The reinforcing member (side beam) 10 may be a hollow block made of light metal having hooks 10a to be fitted with the metallic pipes of the ridge beams 3 on the both sides thereof as shown in the perspective view of Fig. 3(b) showing the reinforcing member of the variation of the first embodiment. This structure is preferable because the necessity of preparing other fasteners for attaching the reinforcing member (side beam) 10 to the ridge beams 3 can be eliminated and the reinforcing member can be easily attached when needed. However, the reinforcing member 10 may be fixed by using bolts or fasteners.

(Second Embodiment)

Fig. 1(b) is a perspective view of the structure of a second embodiment of the present invention. A crosswind-resistant outdoor tent of the second embodiment shown in Fig. 1(b) includes one or more reinforcing members (ridge beams) 11 (see Fig. 4(a)) arranged to have a projecting ridge 11b on the zenith in order to prevent rain water from collecting on the flat zenith of the awing having trapezoidal sides 100.

Fig. 4(a) is a perspective view showing a framework of the second embodiment of the present invention and Fig. 4(b) is a perspective view showing the reinforcing member

of the second embodiment.

As described in the above, in the crosswind-resistant outdoor tent of the first embodiment, rain water may collect on the zenith during the rain because the zenith 100a of the awing roof is flat.

Consequently, one or more reinforcing members (ridge beams) 11 are preferably arranged to extend between the two side beams 4, 4 of the zenith 200a of the framework to have one or more projecting ridges 11b, thereby supporting the awing 1 (see Fig. 1(b)) and thus preventing sag of the awing 1.

The reinforcing member (ridge beam) 11 may be a long block made of light metal having hooks 11a to be fitted with the metallic pipes of the side beams 4 on the both sides thereof as shown in the perspective view of Fig. 4(b) showing the reinforcing member of the second embodiment. This structure is preferable because the necessity of preparing other fasteners for attaching the reinforcing member (ridge beam) 11 to the side beams 4 can be eliminated and the reinforcing member 11 can be easily attached when needed. Of course, the reinforcing member 10 may be fixed by using bolts or fasteners.

By putting the awing 1 to the frame 2 after arranging the reinforcing member (ridge beam) 11 to have the projecting ridge 11b, a projection 100b is formed in the zenith 100a.

The formation of the projection 100b provides a structure capable of preventing rain water from

collecting on the zenith 100a of the awing 1.

Fig. 10 is a schematic illustration for comparison among the height of the crosswind-resistant outdoor tent, of which the awing roof 1 has the trapezoidal upright sides 100 and the flat zenith 100a, the height of the conventional outdoor tent having the gable roof 1', and the height (the apex of the projection 100b) of the crosswind-resistant outdoor tent according to the second embodiment. Similar to the height h1 of the crosswind-resistant outdoor tent with the awing 1 having the flat zenith 100a, the height h1b of the crosswind-resistant outdoor tent of the second embodiment can be lower than that of the conventional gable roof 1' by 70-20%, thus not only preventing rain water from collecting, but also enduring a strong gust of crosswind and further providing other effects such as enabling the construction of a tent longer depth.

(Third Embodiment)

Fig. 1(c) is a perspective view showing the structure of a third embodiment of the present invention. A crosswind-resistant outdoor tent of the third embodiment shown in Fig. 1(c) has a convex portion provided in the zenith 100a so as to form a triangle zenith sides 100d in order to prevent rain water from collecting on the flat zenith 100a (see Fig. 1(a)) of the awing 1 having the trapezoidal sides 100.

Fig. 5(a) is a perspective view showing a framework of the third embodiment of the present invention. As described in the above, in the crosswind-resistant outdoor tent of the first embodiment, rain water may collect on the zenith during the rain because the zenith 100a of the awing roof is flat and therefore the awing 1 may sag. Consequently, as shown in Fig. 5(b), by providing the convex portions on the upper edges of the sides 200 of the framework 2 to form triangles 200c, respectively, and arranging the ridge beam 3 (see Fig. 5(a)) at the apexes 200d of the left and right sides 200 of the framework 2 to extend horizontally, the convex portions 200b are formed at the zenith 200a of the framework, thereby supporting the awing (see Fig. 1(c)) and thus preventing sag of the awing 1 due to rain water or the like.

(Fourth Embodiment)

Fig. 1(d) is a perspective view showing the structure of a fourth embodiment of the present invention. A crosswind-resistant outdoor tent of the fourth embodiment shown in Fig. 1(d) is the same crosswind-resistant outdoor tent of the aforementioned third embodiment except that the awing roof is provided with a ventilator 13 comprising a plurality of openings formed adjacent to each other and with a sheet lid 14 for covering the ventilator 13 of which an upper edge is fixed to a portion about the center of the zenith 100a of

the awing roof by sewing or adhesive bonding and the opposite side edge is connected to portions near the awing edges adjacent to the ventilator 13 by one or more tie-down means 15. The tie-down means 15 exhibit moderate fixing strength so that the lid 14 is adapted to automatically open when subjected to gust or big wind to prevent the awing 1 from being blown away.

The crosswind-resistant outdoor tent according to the fourth embodiment is structured such that when crosswind (arrow) is blowing as shown in the explanatory perspective view of Fig. 6 showing the fourth embodiment of the present invention, wind passes through the ventilator 13 to push up the sheet lid 14 and thus passes away, reducing the blowing up wind pressure applied on the awing roof by the crosswind.

Though the ventilator 13 is composed of a plurality of circular openings in this embodiment, the shape of the openings is not limited to circle and the number of the openings may be one or more. In addition, the number of the sheet lids 14 arranged outside of the ventilator 13 may be one or more. Any suitable configuration capable of reducing the flowing up pressure on the awing roof may be employed.

In case of forming a plurality of ventilators 13, the ventilators 13 are formed to have such shape, number, and width that the portions of the awing roof remaining

between adjacent openings can retain strength of the awing roof and the ventilators 13 are formed to have such size that the total area of the ventilators 13 allow the lid(s) 14 to open when subjected to gust or big wind.

The sheet lid 14 is preferably made of waterproof material.

The sheet lid 14 is preferably made of the same material as that of the awing 1 such as sail cloth.

The corner edges of the sheet lid 14 of the crosswind-resistant outdoor tent according to the fourth embodiment of the present invention are preferably connected to portions near the shorter awing edges adjacent to the ventilator 13 by one or more tie-down means 15 which exhibit moderate fixing power.

The tie-down means 15 may be means allowing a part or parts of the corner edge adjacent to the ventilator 13 to be free, means comprising a hook-and-loop fastener, or means using attraction of magnet, further alternatively, means of tying down the both lower ends of the lid 14 via rubber cords 16 as shown in the explanatory perspective view of Fig. 7(a) showing a tie-down means of the fourth embodiment, or means of connecting portions near the both lower ends of the ventilator 13 and the both lower ends of the lid 14 via rubber cords 18 passing through and stopped at both ends thereof by rings 17 made of cord, metal, or plastic fixed to the both lower ends of the lid 14 and fixed to portions of the awing 1 around the both

lower corner edges of the ventilator 13 as shown the explanatory perspective view of Fig. 7(b) showing a tie-down means of the fourth embodiment. The rubber cord 18 is preferably arranged to have such a length that the lid 14 is blown up by gust or big wind to a level required to allow wind pressure to escape through the ventilator 13.

In order to prevent the lid 14 blown up by gust or big wind from not returning and from keeping the ventilator open, it is effective to tie the both lower ends of the lid 14 via rubber cord 16 or to tie portions near the both lower ends of the ventilator 13 and the both lower ends of the lid 14 via rubber cords 18 passing through and stopped at both ends thereof by rings 17 made of cord, metal, or plastic fixed to the both lower ends of the lid 14 and fixed to portions of the awing 1 around the both lower corner edges of the ventilator 13.

Alternatively, as shown in the explanatory perspective view of Fig. 8 showing a tie-down means of the fourth embodiment, the left and right side edges of the sheet lid 14 may be fixed via expansible waterproof sheets 19 comprising bellows arranged at the left and right ends of the ventilator 13, thereby preventing rain water from entering into the tent through the left and right ends of the ventilator 13 when the lid 14 opens.

The area ratio between the ventilator 13 and the lid 14 covering the ventilator 13 in the embodiment is defined to take account of the degree of entering rain

water when the lid 14 is blown up by gust or big wind during the rain. It is preferable to employ the means using expansible waterproof sheets 19 comprising bellows arranged at the left and right side edges of the ventilator 13 to fix the left and right corner edges of the sheet lid 14 so as to prevent rain water from entering into the tent through the left and right ends of the ventilator 13 when the lid 14 opens.

It is not necessary to form the plural ventilators 13 to have the same shape and the same area and it is also not necessary to set the tie-down means 15 to provide the same fixing strength between the awing 1 and the lid 14. Any suitable forms allowing the lid to automatically and effectively open by gust or big wing according to the size of wind may be employed.

The fourth embodiment of the present invention shown in Fig. 1(d) is the same crosswind-resistant outdoor tent of the aforementioned third embodiment except that the awing roof is provided with a ventilator 13 comprising a plurality of openings formed adjacent to each other and with a sheet lid 14 for covering the ventilator 13 of which an upper edge is fixed to portions about the center of the zenith 100a of the awing roof by sewing or adhesive bonding and the opposite side edge is connected to portions near the awing edges adjacent to the ventilator 13 by one or more tie-down means 15 capable of exhibiting moderate fixing strength. On the

other hand, the crosswind-resistant outdoor tent of the first embodiment and the crosswind-resistant outdoor tent of the second embodiment may be also to have the same structure that a ventilator 13 comprising one opening or ventilator(s) 13 comprising a plurality of openings are formed and one or more sheet lids 14 are provided to cover the ventilators 13 such that the upper edges are fixed to portions about the center of the zenith 100a of the awing roof by sewing or adhesive bonding and the opposite side edges are connected to portions near the awing edges adjacent to the ventilator 13 by one or more tie-down means 15 capable of exhibiting moderate fixing strength so that the lids 14 are adapted to automatically open when subjected to gust or big wind to prevent the awing 1 from being blown away.

Though the ventilator 13 is formed near the zenith 100a in the fourth embodiment of the present invention shown in Fig. 1(d), ventilators 13 may be formed in left and right upright sides of the awing roof and sheet lids 14 may be fixed according to the installation place and/or environment of the crosswind-resistant outdoor tent.

With regard to the crosswind-resistant outdoor tent of the present invention, Fig. 12 provides a comparative table indicating blowing-up wind pressures on tent and Fig. 13 provides a comparative table indicating blowing-

up wind pressure on windward side of tent.

The comparative tables indicate blowing-up wind pressures on tent and blowing-up wind pressure on windward side of tent, these values were measured with wind velocity of 5-20 m/s in case of a conventionally used outdoor tent having a gable roof of which right and left upright sides are triangle in shape (conventional gable roof type), an outdoor tent of the aforementioned third embodiment with a roof of which right and left upright sides are trapezoidal in shape and having a convex portion arranged on the zenith such that the sides of the zenith are triangle in shape (trapezoidal roof type: without sheet lids), and an outdoor tent of the aforementioned fourth embodiment with a roof of which right and left upright sides are trapezoidal in shape and having a convex portion arranged on the zenith such that the sides of the zenith are triangle in shape and a plurality of ventilators 13 formed near the zenith (trapezoidal roof type: with sheet lids). The tables also indicate rates of improvement with regard to the blowing-up wind pressures on tent and fall-resisting properties, that is "NG" if fell or "OK" if endured against falling with regard to the blowing-up wind pressures on windward side of tent.

Prerequisite for the calculation:

1. Each tent is assumed as a temporary building and the wind pressure calculation under Article 87 of

Building Standard Law is applied (wind velocity is defined separately for the study);

2. Each tent is installed on the ground and the four corners are fastened by knocking anchors;

3. The own weight of each tent is 80kg and the pulling force of one of the anchors is 20kg;

4. It is assumed that respective parts such as poles and beams and joints have enough strength, respectively, for conducting the study of fall-resisting properties of the tents;

5. It is assumed that tent always flows up or falls by wind pressure prior to the breaking of parts;

6. The study is done with unidirectional wind and the wind pressure and the fall-resisting property when complex wind such as wind blowing through the tall buildings blows are not taken into consideration; and

7. Velocity pressure is calculated according to Article 87 of Building Standard Law and Construction Ministry's notice No. 1454 and assuming the ground roughness level as II.

·Wind velocity 5m/s : Velocity pressure 27N/m^2

·Wind velocity 6m/s : Velocity pressure 38N/m^2

·Wind velocity 7m/s : Velocity pressure 52N/m^2

·Wind velocity 8m/s : Velocity pressure 68N/m^2

·Wind velocity 9m/s : Velocity pressure 86N/m^2

·Wind velocity 10m/s : Velocity pressure 107N/m^2

·Wind velocity 11m/s : Velocity pressure 129N/m^2

·Wind velocity 12m/s : Velocity pressure 154N/m^2

·Wind velocity 13m/s : Velocity pressure 180N/m^2

·Wind velocity 14m/s : Velocity pressure 209N/m^2

·Wind velocity 15m/s : Velocity pressure 240N/m^2

·Wind velocity 16m/s : Velocity pressure 273N/m^2

·Wind velocity 17m/s : Velocity pressure 308N/m^2

·Wind velocity 18m/s : Velocity pressure 345N/m^2

·Wind velocity 19m/s : Velocity pressure 385N/m^2

·Wind velocity 20m/s : Velocity pressure 426N/m^2

As for the blowing-up wind pressure on tent, the highest blowing-up wind pressure was a value in case of the tent of conventional gable roof type, the next highest blowing-up wind pressure was a value in case of the tent of trapezoidal roof type (without sheet lids), and the lowest blowing-up pressure was a value in case of the tent of trapezoidal roof type (with sheet lids) as shown in the comparative table of Fig. 12 indicating blowing-up wind pressures on tent.

As compared to the value of the tent of conventional gable roof type, the rate of improvement of the tent of trapezoidal roof type without sheet lids was 74.5%, and the rate of improvement of the tent of tent of trapezoidal roof type with sheet lids was 72.4-66.0%, that is, it is found that the blowing-up wind pressure was reduced by about 45%.

Also as for the blowing-up wind pressure on windward side of tent, the highest blowing-up wind pressure was a value in case of the tent of conventional

gable roof type, the next highest blowing-up wind pressure was a value in case of the tent of trapezoidal roof type (without sheet lids), and the lowest blowing-up pressure was a value in case of the tent of trapezoidal roof type (with sheet lids) as shown in the comparative table of Fig. 13 indicating blowing-up wind pressure on windward side of tent.

While the conventional gable roof type tent fell (NG) at wind velocity of 10m/s, the trapezoidal roof type tents (without sheet lids and with sheet lids) fell (NG) at wind velocity of 13m/s.

INDUSTRIAL APPLICABILITY

The following effects according to the present invention may be obtained:

1. According to the crosswind-resistant outdoor tent of the present invention, the vertical sectional area of the awing is reduced, thereby reducing the wind pressure applied by crosswind and thus achieving an outdoor tent capable of enduring a strong gust of crosswind.
2. According to the crosswind-resistant outdoor tent of the present invention, the height of the tent can be relatively lower, thereby achieving the construction of a safe tent having longer depth and larger floor area.
3. According to the crosswind-resistant outdoor tent of the present invention, the height of the tent can be

relatively lower, thereby increasing the chances for user to use an outdoor tent at such a place that a construction lies above such as a river area under a bridge.

4. According to the crosswind-resistant outdoor tent of the present invention, a ventilator comprising one or more openings adjacent to each other is formed in the awing roof and ventilators are formed in sides of the awing roof, and lids are arranged to cover the openings and adapted to automatically open, thereby preventing the lift of tent and thus reducing the risk of injury of person due to the lift of tent.

5. In the crosswind-resistant outdoor tent in which left and right side edges of a lid for ventilator are fixed to the awing via expansible waterproof sheets comprising bellows, rain water is prevented from entering into the tent through the left and right ends of the ventilator when the openings open.

6. The tension of the awing portion remaining among the openings keeps the shape of the awing, thereby preventing any portion of the awing about the ventilators from sagging and also preventing the lid outside of the ventilators from sinking into the awing.